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ABSTRACT OF THE 19TH CONGRESS OF ECHOCARDIOGRAPHY

Poster session: Miscellaneous

Echocardiographic assessment of cardiac remodeling in the high-level football players

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Introduction.— The aim of this study is to assess the morphological and hemodynamic cardiovascular changes of 24 high-level football players, using Doppler-echocardiography, and compare them to a similar control group.
Methods and results.— Twenty-four elite football players were matched to 24 normal subjects according to age, sex, and body surface. All participants had a clinical examination, resting ECG, Doppler-echocardiography and a measurement of maximal oxygen uptake (VO_2 max). The echocardiographic variables were compared between two groups by the Student's *t*-test and other statistical tests, using the SPSS 12 for Windows software. Compared to the control group, the wall thickness (10.49 + 1.04 vs). 7.5 + 2.04 mm, $P < 0.05$), the LV end-diastolic diameter (57.1 + 3.70 vs. 41.2 + 3.65 mm, $P < 0.01$) and left atrium surface (20.16 + 2.03 vs. 16.16 + 1.83 cm2, $P < 0.01$) were significantly more important in football players. The LV and RV ejection fractions were similar in both groups. The RV long-axis diastolic diameter (8 + 0.5 vs. 6.5 + 1.1 mm, $P < 0.01$) and S-wave using DTI (0.17 + 0.02 vs. 0.14 + 0.02, $P < 0.05$) were more important among football players.
Discussion.— The hemodynamic and morphological changes result from an acquired cardiac adaptation in athletes with important endurance and resistive efforts. The majority of players presented an intermediate-type of remodeling, but the more offensive ones had an endurance-type heart, whereas the defense players had a resistance-type aspect.
Conclusion.— This study on the cardiac remodeling in high-level athletes permits to have a distinctive approach between physiological and pathological remodeling. This remodeling varies according to the player's post and exercise capacities. In a football player, a correlation between physical level and physical capacity is plausible.

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Echocardiographic assessment of 40 veteran marathoners

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Introduction.— The aim of our study is to assess morphological, hemodynamic cardiovascular and pulmonary changes, in 40 veteran marathoners aged over than 40 years and compared to a control group using electrocardiogram, echocardiography, exercise testing and VO_2 max.
Methods and results.— Our study is prospective comparing two groups: group of 40 veteran marathoners and control group of forty people. All participants underwent a clinical examination, electrocardiogram at rest, Doppler echocardiography, a stress test and the measurement of VO_2 max. Electric variables, echocardiographic and VO_2 max were compared between the two groups using the Student test and other statistical tools with the software SPSS 17.0. In the group of veteran marathoners, the wall thickness was (9,9 ± 1.5 vs 8.4 ± 1.4 mm in the control group; $P < 0.05$), the left ventricular diastolic diameter was (56.3 ± 3.40 vs 40.2 ± 3.5 mm in the control group; $P < 0.01$), and the surface of left atrium was (18.5 ± 3.9 vs 14.0 ± 3.5 cm2 in the control group; $P < 0.1$).The VO_2 max was (48.9 ± 7.9 vs 18.5 ± 6. in the control group) ($P < 0.01$).
Discussion.— The hemodynamic and morphological changes are the results of a cardiac adaptation required in veteran marathoners who are subjected to moderately important efforts. They have not only cardiac remodeling but also an optimal filter then using of oxygen inspired dependent on years of training and the number of training sessions per week.
Conclusion.— Cardiovascular and pulmonary exploration in veteran marathoners aged over forty allows a distinction between electrical changes and cardiac remodelling in physiological and pathological conditions. These changes vary depending on years of training and hours of training per week. A correlation between their size and physical ability of veteran marathoners is plausible.

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Comparison between non-invasive coronary flow reserve and fractional flow reserve to assess the functional significance of left anterior descending artery stenosis of intermediate severity

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Background.— To assess the functional significance of left anterior descending artery (LAD) stenosis of intermediate severity (IS) (50—70% diameter stenosis) is challenging.
Objective.— To compare the value of non-invasive coronary flow reserve (CFR) to the invasive fractional flow reserve (FFR) in the setting of LAD stenosis of angiographic IS.
Methods.— Fifty stable consecutive patients (pts) (mean age 63 ± 13 years, 11 females, mean left ventricular ejection fraction 61 ± 10%) with an angiographic proximal LAD stenosis of IS (55.5 ± 5% diameter stenosis, QCA), no previous anterior myocardial infarction, and with various vascular risk factors, were prospectively studied. They underwent FFR with intracoronary bolus adenosine (150 μg), and CFR using intravenous adenosine (140 μg/kg per minute over 2 min), in the distal part of the LAD, the same day in nearly all cases. CFR

was defined as hyperemic peak diastolic LAD flow velocity divided by baseline flow velocity (normal value > 2) and FFR was defined as distal pressure divided by mean aortic pressure during maximal hyperemia (normal value > 0.8).
Results.— The mean FFR and CFR were 0.84 ± 0.07 and 2.7 ± 0.75 respectively, in the whole population. Concordant results between FFR and CFR were seen in 44 cases (88%) and discordant results in six cases (12%). There was a significant correlation between CFR and FFR ($r = 0.59$, $P < 0.01$). A better correlation was found between FFR and % LAD diameter stenosis, and lesion length (all, $P < 0.05$), than between CFR and the same anatomic markers of stenosis severity (all, P = NS).The sensitivity, specificity, positive and negative predictive values of CFR more than 2 to detect a non significant lesion defined by a normal FFR were 95, 69, 90, and 82%, respectively.
Conclusion.— In pts with LAD stenosis of IS, discordant results between non-invasive CFR and FFR were not unusual, and the anatomic determinants of the stenosis are better correlated to FFR than to CFR. However, CFR which is a global evaluation of the coronary tree has a very high sensitivity to detect a non significant lesion, despite the high prevalence of vascular risk factors.

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Interest of atrial contractile function's study in coronary heart disease

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Introduction.— Assessment of myocardial systolic and diastolic function is a primary objective in a perspective diagnosis, prognosis and therapy of ischemic heart disease. Based on the concept postulating that myocardial ischemia impairs diastolic function earlier than systolic function and since the atrial contraction is an integral part of diastolic function, it is legitimate to be interested in studying the atrial function in assessing diastolic function of ischemic cardiomyopathy.
Objective.— The aim of our work is to study in coronary patients the intake of conventional echocardiography and of pulsed doppler tissue imaging (DTI) in the evaluation of atrial contractile function.
Materials and methods.— Prospective study in 60 patients hospitalized for coronary heart disease that we compared to 40 witnesses. All the subjects have undergone a conventional echocardiography. Only the patients have a coronary angiography. We investigated the conventional echocardiographic parameters of the two atria namely lateromedian and supero-inferior diameters, atrial surfaces before and after atrial contraction, atrial volumes, fractional shortening (S-FE) and the fraction of ejection (V-FE) atrial. With pulsed DTI we measured peak velocity of atrial contraction (Va) at the free wall of the right atrium (Va-RA), the left atrium (Va-LA) and in the interatrial septum (Va-IAS). We studied the electromechanical delay of the onset, the peak and the end of atrial contraction by measuring respectively the time between the beginning of the P wave and the onset, the peak and the end of atrial contraction.
Results.— The mean age was 53.5 years ± 10.9 (26,76) comparable to the average age of witnesses. Ninety percent of the population was male. The conventional echocardiography study showed an increase in atrial dimensions associated to the reduction of fractional shortening (22.5 ± 12.1% vs. 32.7 ± 12.8%, $P < 0.001$) and ejection (35.8 ± 16.5% vs. 50.9 ± 11.9%, $P < 0.001$) of both atria in coronary patients compared with healthy subjects. Va was similar in the free wall of the RA and LA ($P = 0.1$) and less on the IAS ($P < 0.001$) respectively 14.9 ± 3.5 cm/s, 14.1 ± 3.8 cm/s and 10.9 ± 2.6 cm/s. In coronary patients, there are a significant decrease in the rate of atrial contraction in the three atrial sites (Va-LA: 11.5 ± 4 cm/s vs. 14.1 ± 3.8 cm/s; Va-RA: 12, 4 ± 3.7 cm/s vs. 14.9 ± 3.5 cm/s; Va-IAS: 8.8 ± 2.7 cm/s vs. 10.9 ± 2.6 cm/s, $P < 0.001$). Similarly, there's a significant lengthening ($P < 0.001$) in the electromechanical delay affecting the onset (RA: 67.3 ± 17.9 ms vs. 50 ± 11.9 ms; IAS: 73.1 ± 18.3 ms vs. 59, 3 ± 15.9 ms; LA: 81.3 ± 17.7 ms vs. 55.4 ± 13.1 ms), the peak (RA: 127.2 ± 110.3 ± 23ms vs. 27ms; IAS: 130.2 ± 18, 3ms vs. 120 ± 17.4 ms; LA: 138.1 ± 17.3 ms vs. 126.8 ± 17.4 ms) and the end (RA: 196.8 ± 25.7 ms vs. 175.6 ± 25.3 ms; IAS: 195 ± 22.2 ms vs. 179.6 ± 16.4 ms; LA: 195.5 ± 22.8 ms vs. 177.6 ± 23ms) of the atrial contraction. We found that the Va-LA: is independent of the presence or absence of a transwall myocardial infarction. The decrease of Va-LA below 10 cm/s is for a breach of the anterior interventricular coronary artery.
Conclusion.— The atrial contractile dysfunction on echocardiography can help to establish the positive diagnosis of myocardial ischemia and to assess its severity. Pulsed DTI can make a better understanding of the impact of coronary heart disease on the sequence of mechanical atrial contraction. New techniques (strain, 3D echo) could improve the contribution of the study of atrial function in ischemic heart disease.

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Prediction of exercise capacities and cardiac involvement in scleroderma patients using a novel Doppler echocardiographic parameter

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Background.— The heart is one of the major organs involved in scleroderma, and the presence of cardiac injury usually portends poor prognosis. Ischaemia and fibrosis are the major mechanisms involved in scleroderma heart disease, and early detection is important. Echocardiography with modern ultrasound modalities such as tissue Doppler imaging (TDI) and 2D strain is considered as the best method for routine cardiac assessment, showing left and right ventricular systolic and diastolic function, pulmonary hypertension, and pericardial involvement. Besides, conduction defects are common in scleroderma, and among them, interatrial block (IAB) has been reported as a mark of atrial involvement.
Aims of the study.— To assess the prevalence of IAB by measuring the inter atrial electro-mechanical delay (IAMD) in scleroderma patients using TDI; to evaluate the correlation between IAMD and clinical, biological, and other echo-Doppler parameters.
Methods.— Patients with systemic sclerosis were selected if there were in sinus rhythm and were able to walk. The following data were collected: type and duration of the disease, NYHA functional class and distance walked in six minutes (6′WD), P wave duration on ECG, serum creatinine and Nt proBNP levels. Echo-Doppler study comprised: left ventricular (LV) mass, LV systolic function (LVEF: biplane Simpson's method), LV diastolic function (mitral E and A waves velocities, E/A and E/e' ratios), right ventricular (RV) function (TAPSE), pulmonary artery pressure (tricuspid regurgitation velocity—TRv), left atrial (LA) volumes and function (Simpson's method). IAMD was assessed using colour TDI study, by measuring the delay between annular tricuspid and mitral a' waves. A cut off value of 35 ms was chosen to define the presence of an IAB.
Results.— Forty patients were studied. Scleroderma was of the limited type in 32 patients, and of the diffuse type in 8. Forty percent of patients were found to have IAB at Doppler study. These patients were significantly older. After adjustment for age, they had more severe symptoms, lower 6′WD, higher Nt proBNP and creatinine levels, and longer P wave duration than patients without IAB. No difference was found regarding LV dimension and LVEF. LV mass was higher, E/A and E/e' ratios were significantly different, LA volume was significantly higher, TAPSE was lower, and TRv was higher. Most importantly, IAMD correlated well with 6′WD ($r = 0.72$, $P = 0.0001$).
Discussion.— IAB prevalence among sleroderma patients is high (40%). IAMD was found to be associated with lower exercise capacities, altered LV diastolic function, decreased LA and RV function,